

## LICENSEE EVENT REPORT (LER)

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Information and Records Management Branch (t-6 f33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office Of Management And Budget, Washington, DC 20503. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

FACILITY NAME (1)

Dresden Nuclear Power Station, Unit 3

DOCKET NUMBER (2)

05000249

PAGE (3)

1 of 4

TITLE (4)

Reactor Scram from Main Turbine Stop Valve Closure due to Turbine Trip Caused by Lockout Valve Solenoid De-energization During Weekly Overspeed Oil Trip Testing

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MON TH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
12	11	1999	1999	06	00	01	10	2000	N/A	N/A
OPERATING MODE (9)			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more) (11)							
1			20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)	
POWER LEVEL (10)			20.2203(a)(i)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)	
100			20.2203(a)(2)(ii)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71	
			20.2203(a)(2)(ii)		20.2203(a)(4)		X 50.73(a)(2)(iv)		OTHER	
			20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 306A	
			20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)			

## LICENSEE CONTACT FOR THIS LER (12)

NAME

Danny Chiou, System Engineer

TELEPHONE NUMBER (Include Area Code)

(815) 942-2920 ext 2789

## COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

## SUPPLEMENTAL REPORT EXPECTED (14)

YES			NO			EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR
(If yes, complete EXPECTED SUBMISSION DATE)			X							

ABSTRACT (Limit to 1400 spaces, i. e., approximately 15 single-spaced typewritten lines) (16)

On December 11, 1999, at 0111 hours, operations personnel were performing the Main Turbine weekly surveillances per DOS 5600-02, "Weekly Turbine Checks." The Unit 3 tripped from Main Turbine Stop Valve closure initiated by the turbine overspeed test circuits.

The cause of this event was determined to be a faulty XK3 relay socket that resulted in the turbine lockout solenoid being de-energized during the oil trip testing. The de-energization of lockout valve caused the Electro Hydraulic Control (EHC) Emergency Trip System (ETS) hydraulic pressure to bleed off from the system pressure. This cause was determined through the measurement of AC voltages before the XK3 relay contact and after the contact that supplies voltage to the lockout valve.

The cause of this event was the failure of the XK3 relay socket. Corrective actions included replacement of the defective socket for the XK 3 relay.

The overall safety significance of this event was minimal.

This report is being submitted pursuant to 10 CFR 50.73(a)(2)(iv), which requires the reporting of any event or condition that results in a manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS).

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FACILITY NAME (1)	DOCKET (2)	LER NUMBER (5)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Dresden Nuclear Power Station, Unit 3	05000249	1999	006	00	2 OF 4

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

**PLANT AND SYSTEM IDENTIFICATION:**

General Electric - Boiling Water Reactor - 2527 MWt rated core thermal power

Energy Industry Identification System (EIIIS) Codes are identified in the text as [XX] and are obtained from IEEE Standard 805-1984, "IEEE Recommended Practice for System Identification in Nuclear Power Plants and Related Facilities."

**EVENT IDENTIFICATION:**

Reactor Scram from Main Turbine Stop Valve Closure due to Turbine Trip Caused by Lockout Valve Solenoid De-energization During Weekly Overspeed Oil Trip Testing

**A. PLANT CONDITIONS PRIOR TO EVENT:**

Unit: 3

Event Date: 12/11/99

Event Time: 0111

Reactor Mode: 1

Mode Name: Run

Power Level: 100

Reactor Coolant System Pressure: 1003 psig

No other systems or components were inoperable or out of service at the start of this event which contributed to the event.

**B. DESCRIPTION OF EVENT:**

This LER is being submitted pursuant to 10 CFR 50.73(a)(2)(iv), which requires the reporting of any event or condition that results in manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS) [JC].

On December 11, 1999, at 0111 hours, operations personnel were conducting Main Turbine weekly surveillances per DOS 5600-02, "Weekly Turbine Checks." Unit 3 tripped from Main Turbine Stop Valve closure initiated by the turbine overspeed test circuit.

Prior to the surveillance being performed a pre-job brief was held discussing the implementation of Weekly Turbine Checks. The Nuclear Station Operator (NSO) successfully performed the 24-volt master trip solenoid valve test and thrust bearing wear detector test. The subsequent test to be performed was the turbine overspeed oil trip check. The NSO pushed the "TEST" pushbutton per procedure on the oil trip check panel. The expected response, annunciator "Turb Overspeed Trip Blocked" was received. The NSO verified the yellow "LOCKED OUT" light illuminated and the green "NORMAL" light extinguished. The "LOCKED OUT" lockout indicating light was illuminated as required by the procedure. This light indicates that the test may proceed, as no turbine trip will occur during the subsequent steps. The turbine trip is blocked since the mechanical trip valves (MTV) ability to drain EHC oil header pressure is blocked by the lockout valve.

The NSO proceeded to push the "OIL TRIP" pushbutton. This step places oil in the oil trip circuit simulating a turbine overspeed condition. Immediately upon depressing the "OIL TRIP" pushbutton, the turbine stop valves closed and reactor scrammed. When the reactor is operating at greater than 45% reactor power, there is a direct reactor scram on Main Turbine Stop Valves > 10% closed.

Actions were taken per station procedures to place the unit in a stable condition.

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Dresden Nuclear Power Station, Unit 3	05000249	1999	006	00	3 OF 4

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In order to determine the cause of the turbine trip, a troubleshooting plan was developed in accordance with station procedures. Potential failure modes were identified and potential equipment concerns relating to those causes were identified. A troubleshooting plan was developed and performed on the oil trip circuitry and consisted of the following steps utilizing the equipment failure determination process:

1. Verified electrical operation of the EHC system Oil Trip Solenoid Valve (OTSV) by measuring resistance across the solenoid valve. This confirmed adequate continuity to pass the necessary current for opening it's associated oil supply valve.
2. Verified electrical operation of the EHC system Lockout Valve Solenoid (LVS) by measuring resistance across the solenoid valve. This confirmed adequate continuity to pass the necessary current for repositioning the EHC system Lockout Valve.
3. Verified 120 VAC power available to Lockout Valve Solenoid (LVS) by measuring the voltage.
4. Verified Relay XK3 to be picked up due to EHC system TEST lockout button being depressed.
5. Checked voltage across the appropriate XK relay. This measurement proved to be intermittent based on the movement on the relay socket. The continuity to the LVS was interrupted concurrently with the depression of the "OIL TRIP" pushbutton causing a trip of the main turbine.

The relay socket has been replaced and successfully tested. In addition, a functional test was performed per station procedures as the PMT to validate electric and hydraulic positions of the turbine trip circuit.

It is to be noted that during this Forced Outage, only the XK1 relay and socket and XK3 socket were replaced due to the fact that they are the only relays in this system that can result in a turbine trip based on a single failure.

**C. CAUSE OF EVENT:**

The cause of this event was determined to be a faulty XK3 relay socket that resulted in the turbine lockout solenoid valve being de-energized during turbine weekly testing. The hydraulic spool internal to the lockout valve shifted when the solenoid was de-energized and allowed the EHC hydraulic pressure to be bled off from the Emergency Trip System. (NRC Cause Code B)

This cause was determined through the measurement of AC voltages before the XK3 relay contact circuit and after the relay contact circuit that supplies the voltage to the lockout valve. Maintenance personnel measured 120VAC in the circuit prior to the relay contact. The voltage measurement obtained in the circuit after the relay contact supplying the lockout valve was found to be approximately 2 VAC. Maintenance personnel then moved the XK3 relay and the relay socket connection. The relay socket connection was found to be loose and after this manipulation, 120 VAC measurement was obtained in the circuit after the XK3 relay. The XK3 socket relay was found to be very loose and further manipulations allowed the scenario to be repeated. The socket was replaced with a new relay socket, which held the relay solidly. This socket connection now requires a prying action to separate. The results of this investigation concluded that no inappropriate human performance actions were identified related to the reactor scram or turbine trip.

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Dresden Nuclear Power Station, Unit 3	05000249	1999	006	00	4 OF 4

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**D. SAFETY ANALYSIS**

All safety systems were operable during the event. The plant safety systems performed as designed. There were no radiation releases to the site or public. The health and safety of the public were not compromised as a result of this event. Therefore, the safety significance of this event is minimal.

**E. CORRECTIVE ACTIONS:**

- 1) Replaced the failed XK3 relay socket (complete)
- 2) Replaced XK1 relay and socket for Master Trip Solenoid Valve (complete)
- 3) Perform an engineering evaluation for Unit 2 and Unit 3 to replace the existing GE XK relays and sockets with Potter-Brumfield relays associated with the EHC System. (ATI # 20672)

**F. PREVIOUS OCCURRENCES:**

No previous occurrences were identified

**G. COMPONENT FAILURE DATA:**

Manufacturer  
GE

Nomenclature  
XK relay

Model/ Part Number  
CR 120H